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RECOGNISING ACHIEVEMENT

GCE

ICT

Advanced GCE **G063**

Systems, Applications and Implications

Mark Scheme for June 2010

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Section A					
Question			**Expected Answer**	**Marks**	**Additional Guidance**
1	**(a)**		**Describe prototyping as a method of software development.** One mark for point, one for expansion eg: • position in the systems life cycle (1) • a model is built (1) to enable an approved version to be put into production (1) • an iterative process of design and evaluation (1) repeated until an interface is satisfactory to the user (1) • a working user interface is created (1) which does not process any data (1)	**[2]**	*One mark can be awarded for **accurately** placing in the systems life cycle.*
1	**(b)**		**Explain the importance of test plans in the systems cycle.** One mark for point, one for expansion eg: • plans to test the system's performance against the design specification (1) allows discrepancies to be identified (1) • describes each item that needs to be tested (1) specifies how each test will be carried out upon it (1) • identifies input values and shows expected output values (1) documents test details for repeat of tests (1) • documents the testing strategy (1) through the normal, extreme and erroneous test values used (1)	**[4]**	

Question			Expected Answer	Marks	Additional Guidance
2	(a)		**Identify *three* characteristics of a local area network (LAN).** Any three from: • within a locally defined area (1) • connected by high speed connections (1) • can have direct connections between machines (1) • connected by cables owned by the company (1) • able to share local peripherals (1)	**[3]**	
2	(b)		**Compare an intranet to an extranet.** Must be a comparison. 1 mark for each comparison to max 3: Topics for comparison may include, for example: **services** • an intranet provides an organisation with services that are only available to authorised users *whereas* an extranet allows public access to part, or all, of a company's intranet services via the Internet (1) **access** • an organisation's intranet does not have to provide Internet access *whereas* an extranet is accessed using the Internet (1) **security** • an intranet requires usernames and id's *similarly* an extranet is only available to approved parties (1) **connectivity** • an intranet is a secure private computer network using an organisation's communications infrastructure *whereas* an extranet uses public telecommunication systems to securely share part of an organization's information (1)	**[3]**	

Question			Expected Answer	Marks	Additional Guidance
3	(a)		**Define the term bandwidth.** One mark for point, one for expansion eg • a measurement of the volume of data (1) per second (1) • rate of transmission (1) in bps (1) • the difference between the maximum and minimum frequency of signal (1) that a communications channel can carry (1) • measure of the capacity (1) of a network/communications channel (1) • maximum amount of data (1) in a given time (1)	**[2]**	*A mark should be awarded for an answer relating to capacity/volume or rate of transmission.* *The second mark should be a continuation of the first point and relate to a time frame or channel of communication.*
3	(b)		**Describe how different communication media affect the bandwidth available.** One mark for point, one for expansion eg • different media have different bandwidths (1) and therefore different data carrying capabilities (1) • capacity of the medium (1) affected by factors such as signal strength and noise (1) • the more data that can travel across the bandwidth the higher the risk of collision and error (1) requiring retransmission and increased network traffic (1) • the higher the data rate of a particular medium results in more data transmission (1) in a given time (1) freeing bandwidth for subsequent transmission (1)	**[4]**	*A candidate can not gain more than two marks solely for the identification of points.* *Allow interpretation of 'media' type of file being transferred.* *Allow suitable examples.*

3	**(c)**		**Describe *three disadvantages* of using wireless communication in the home.** One mark for point, one for expansion to a Max of 3 bullet points eg • obstructions (1) such as furniture, floors, walls (1) can reduce signal strength (1) • other electronic equipment (1) can interfere with signal transmission (1) • each wireless router needs to operate on a different frequency (1) to avoid interference (1) • signals can be picked up from outside the home (1) leading to issues of security (1) • distance from base station (1) can reduce signal reception (1) • concurrent downloads by multiple users (1) reduces bandwidth capacity (1)	**[6]**	*A candidate can not gain more than three marks solely for the identification of disadvantages.*

Question			Expected Answer	Marks	Additional Guidance
4	(a)		**Describe what is meant by an expert system.** Any three from: • a computer program that attempts to solve a problem/ draws conclusions (1) • in the same way as a (human) expert (1) • it has a knowledge base/inference engine/user interface (1) • narrow range of expertise (1) • can learn from experience/heuristic (1) • asks questions based on previous response (1) • based on probabilities not certainties (1)	**[3]**	
	(b)		**Give *two* reasons why the operator of a medical helpline would use a system which relies on rules and probabilities to give advice.** One mark for each reason: • can use predictions (1) • can give conclusions (1) • give evidence for conclusions (1) • dynamic (1) • allow example of system working (1) • no need for expert to man the helpline (1)	**[2]**	
5			**Describe *two* advantages to the centre of having its staff abide by its code of conduct.** One mark for identification of an advantage, one for description: • discipline employees (1) against a publicised set of regulations (1) • sets out rights (1) of what can and cannot be done (1) • can be changed (1) outside of contract (1) • employees to take blame (1) not company (1)	**[4]**	*A candidate can not gain more than two marks solely for the identification of advantages.*

Question			Expected Answer	Marks	Additional Guidance
6			**Explain the need for adaptive, perfective and corrective maintenance of systems.** One mark for identification, one for expansion eg: Max 2 for each type eg: • **adaptive maintenance** will be needed if changes in working practices are identified (1) or the needs of the organisation change (1) or the organisation expands (1) • **perfective maintenance** makes the system work better (1) if new technology shows that the performance of the system could be improved (1) improving for example the speed of searches (1) • **corrective maintenance** used when the system is not functioning properly (1) fixes bugs in the system (1)	**[6]**	

Section B					
Question			**Expected Answer**	**Marks**	**Additional Guidance**
			Questions 7-12 concern a hotel chain in the UK. The directors of a hotel chain have reviewed the systems currently in place across all the hotels.		
7	**(a)**		**Describe critical path analysis as a tool for project planning.** eg: • shows the relationships between parts of a project (1) and the time each part will take to complete / EST and LFT / the overall time it will take to complete (1) • allows the project manager to identify the critical path for each part (1) which is the order they have to be done in (1) • if one part is delayed (1) the entire project will not meet the final deadline (1) • once the time for each part is established (1) the critical path is the one that has the maximum time (1) • allows the project manager to identify tasks that may run over time (1) in order to divert additional resources (1)	**[4]**	*Expect to see vague answers, but be careful of awarding a mark for ramblings that do not address the role of CPA.* *The vocabulary may differ to the mark scheme but if the candidate has gone into a lot of related depth, then the second mark for each identified statement should be available.* *Be generous with genuine attempts, but do not award out of sympathy.* *Bullets are not discrete answers and candidates may answer from a number of bullets.* *All 4 marks can be gained for a single description.*

Question			Expected Answer	Marks	Additional Guidance
7	(b)		**Draw an entity relationship diagram for this part of the database and state where a foreign key would be found.** a customer can book many rooms a booking can consist of many rooms • 1 for correct link entity • 1 for correct degree of relationship between CUSTOMER and ROOM • 1 for correct degree of relationship between ROOM and BOOKING • 1 for locating the foreign key in ROOM when identified as the link entity	**[4]**	*The diagram itself must be accurate. It would be nice to think that entities will be drawn with a ruler, but **do not** penalize the candidate in any way if they are not.*

Question			Expected Answer	Marks	Additional Guidance
8	(a)		**Describe the user interface design tool known as the Model Human Processor.** • (draws an analogy between) the processing and storage of a computer (1) with the perceptual, cognitive, motor and memory activities of a human (1)	**[2]**	*Allow examples in lieu of the expansion for the second mark.*
8	(b)		**Describe how the model can be applied to the design of the user interface.** One mark for point, one for expansion eg • a logical order (1) to the inputs will be initiated (1) • a flashing cursor (1) will indicate where the user is to enter data (1) • a beep may sound (1) when a mistake is made (1) • a visual or audible stimulus is captured (1) for example attention drawn to box on screen (1) the physical attributes of the stimulus are decoded (1) for example the human interprets the response needed (1) • a motor response is initiated (1) the human clicks a mouse (1)	**[4]**	*A description is needed.* *Bullets are not discrete answers and candidates may answer from a number of bullets.* *All 4 marks can be gained for a single description.*

Question			Expected Answer	Marks	Additional Guidance
8	(c)		**Explain the importance of using the following in the design of tailored data entry screens: feedback, consistency, colours.** **feedback** One from eg • ensures correct data entry (1) notifies the user if the data has been entered unsuccessfully (1) • should provide useful assistance (1) messages should be meaningful (1) • should use simple and natural dialogue (1) error messages should be clear and useful (1) • should utilise both audible and visual cues (1) e.g a beep for an incorrect entry (1) **consistency** One from eg • consistently placed prompts to identify data entry area (1) design of buttons/hyperlinks should aid transition (1) • layout on screen should match the layout of any source documents / order in which the operator receives the data (1) follows existing house style / corporate image (1) • logical order and flow of data entry for the user (1) data entered in the correct expected places (1) • appropriate level of language / terminology used throughout (1) user interprets requests appropriately (1) **colours** One from eg • different / recognised colours employed to highlight information required (1) colours should not clash (1) • colours on screen should be user friendly (1) text should be easy to read against background colour (1)	**[6]**	*Allow mix and match within each category.* *Allow examples for second marking point.*

8			**Explain how the following affect the design of an interface:**		
8	**(d)(i)**		**Attention** Any two; • will be maintained by the consistent use of colour/layout (1) • each screen clearly labelled/salient points obvious (1) • use of logical menus (1) • the user will have a limited attention span (1) • use of flashing/inverse video/pop-up messages/sounds/alternative technique to draw attention to something (1)	**[2]**	
8	**(d)(ii)**		**Memory** Any two; • the interface should be uncluttered (1) • the customer will use the interface infrequently (1) • the short term memory will be involved (1) • page layouts should remain consistent (1) • links to pre-existing knowledge (1)	**[2]**	

Question			Expected Answer	Marks	Additional Guidance
9	(a)		**Describe *three* different approaches to the distribution of databases.** One mark for method, one for expansion: • **partitioned** between sites / hotels (1) each separate hotel in the chain holds data on that particular site (1) • **partitioned horizontally**(1) database split between sites/departments by records (1) • **partitioned vertically** (1) database split between sites/departments by fields (1) • **database duplicated** between sites (1) a full copy of the database is held at each hotel (1) • **one central database** (1) relevant/site specific indexes are held at each hotel (1)	**[6]**	*Be mindful of looking for this explanation rather than awarding a further mark for what amounts to a re-wording of the first point.* *A candidate can gain a **maximum** of **three** marks for only identifying approaches.*
9	(b)		**Describe *three* security issues that are associated with distributed databases.** One mark for security issue, one for expansion eg • risk of virus (1) can spread from one database to others (1) • increased risk of hacking (1) because of multiple locations (1) • unencrypted data (1) greater risk of interception during transmission (1) • control of access to data (1) to ensure only those who need access are authorised (1) • risk of data not being synchronised (1) when updating databases (1) • physical security (1) to areas containing access points (1)	**[6]**	

Question			Expected Answer	Marks	Additional Guidance
9	(c)		**Describe *four* recommendations that you would make to the directors of the hotel chain to make the distributed databases more secure.** One mark for recommendation, one for expansion eg • user names/ passwords (1) to prevent unauthorised access (1) • use of secure links (1) for updating database (1) • virus protection / anti-spyware (1) updated regularly (1) at each location (1) • firewall (1) to examine/control data coming into and out of the system (1) • access levels/rights (1) limits what each individual can do/see (1) • individual made responsible for security/physical security at each location (1) locked doors/security patrols/only authorised people allowed in (1) • auditing of database changes (1) transaction logs (1) • audit trail (1) to see who has accessed what data (1) • encryption of data (1) to protect data when moving through public networks (1)	**[8]**	*Candidates need to identify what they are talking about for the recommendation mark **before** getting the second mark for an expansion.* *Max 4 for no expansion.*

Question			Expected Answer	Marks	Additional Guidance
9	(d)		**State what is meant by authentication.** One from: • ensures who sent and who received the data (1) • ensures the person is who they say they are (during transmission) (1) • two parties need to know what authentication is being used in order to access/unscramble the data (1)	**[1]**	*Do **not** accept answers involving 'authorisation'.*

Question			Expected Answer	Marks	Additional Guidance
10	(a)		**Give *four* factors affecting decisions which must be made when upgrading software.** Any four from: • have to take into account the expertise of the current staff (1) • the cost of retraining the staff (1) • costs of buying and installing the new system (1) • the benefits that the new system would bring (1) • the disruption that would be caused by retraining and changeover (1) • the nature of the current system (1) • the method of implementation (1) • the time-scale of the changeover (1) • testing once changeover had occurred (1) • software compatibility with the existing data/hardware (1) • consultation with the staff (1)	**[4]**	
10	(b)		**Describe parallel installation.** One for point, one for expansion eg • both systems run (1) at the same time (1) • old system not abandoned (1) until confidence in new system is gained (1) • results of processing are compared (1) after a set time period (1)	**[2]**	

Question			Expected Answer	Marks	Additional Guidance
10	(c)		**Give *two disadvantages* of this method of installation.** Any two from: • data duplication (1) • increased administrative strain (1) / costs of staffing (1) • jobs are done twice (1) / time taken (1) • inconsistencies have to be checked which is time consuming (1) • errors have to be located (1) • increased personnel costs (1)	**[2]**	
10	(d)		**Describe three characteristics of on-line booking systems used in hotels.** One for point, one for expansion Any three from eg: • types of rooms can be identified / viewed (1) with appropriate price structure (1) • price bands change (1) according to time of week (1) • calendar (1) to fill in arrival and departure dates (1) • area to enter personal details (1) to pre-register at the hotel (1) • drop down lists (1) to select number of nights, adults, children and rooms (1) • booking cancellation/check booking facility (1) to track future stays (1) • search facility (1) to find locations of hotels (1) • check availability (1) before making further travel plans (1) • alternative dates (1) to fit particular requirements (1) • go backwards and forwards to change details (1) without losing all pre-entered information (1) • confirmation of booking generated (1) to present at reception (1)	**[6]**	

			• secure payment facility (1) able to deal with all methods of payment (1) • ability to deduct discounts on payment (1) for reward scheme participants (1) • facilitate concurrent users (1) whilst avoiding double booking (1)		

11 **Discuss how external changes may affect the hotels.**
The quality of your written communication will be assessed in your answer to this question.

It is a banded response, with L, M and H and a mark for a conclusion giving a total of 11.

9-11	4	The candidate is able to discuss clearly the impact and consequences. Candidates will show a detailed level of understanding and be able to explain in detail both the impacts **and** consequence**s** of more than one position. Logical arguments are produced to demonstrate a clear understanding of the question. Ideas will be expressed clearly and fluently using specific knowledge to support and inform the discussion. There may be a reasoned conclusion. Subject specific terminology will be used accurately and appropriately.
6-8	3	The candidate is able to discuss the impact(s) and consequences(s) Candidates will show a limited understanding and be able to explain, at least one impact **and** associated consequence of a given position, however explanations may lack specific detail and/or concentrate on either an impact or consequence with a limited explanation of the other. Subject specific terminology will be used accurately and appropriately.
3-5	2	The candidate is able to explain the impact(s) or consequences(s) Candidates will show a limited understanding and be able to explain, at least one impact **or** consequence of a given position, however explanations may lack specific detail. The explanation, though informed, may stray from the point but specific knowledge will be evident. Some subject specific terminology will be used.
0-2	1	The candidate is able to describe superficially the impact **or** consequences. The information may be poorly expressed and may be in the form of a list of points. Subject specific terminology may be limited or missing.

[11]

		Points for discussion may include for example; • changes in the economy • changes in international markets • changes in individual spending patterns • external changes in technology • changes in legislation • pressure from shareholders • competition	

12 **Discuss hardware and software developments that might change the way hotels function in the future.**

The quality of your written communication will be assessed in your answer to this question.

It is a banded response, with L, M and H and a mark for a conclusion giving a total of 11.

9-11	4	The candidate is able to discuss clearly the impact and consequences. Candidates will show a detailed level of understanding and be able to explain in detail both the impacts **and** consequence**s** of more than one position. Logical arguments are produced to demonstrate a clear understanding of the question. Ideas will be expressed clearly and fluently using specific knowledge to support and inform the discussion. There may be a reasoned conclusion. Subject specific terminology will be used accurately and appropriately.
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0-2	1	The candidate is able to describe superficially the impact **or** consequences. The information may be poorly expressed and may be in the form of a list of points. Subject specific terminology may be limited or missing.

[11]

		Points for discussion may include for example; • intelligent software to note guests' activities • prompts throughout guests' stay based on accumulated data • chip and pin ordering and payment • wireless hotspots • internet access points • adjusting the levels of heat, light etc automatically • Intelligent materials could be used in the construction • holographic representations • virtual staff • virtual tours • personalised paging service • robots as service droids • sensors which activate artificial voices/ virtual PA • iris scanners/voice/face recognition software recognises guests • personalised messages displayed or projected as guests move round the hotel	

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